REMARKS

Claims 1, 3-7, and 13-15 are pending herein.

I. The anticipation rejection based on Maria Rijn Van (WO 02/18058) using US 2003/018507 for reference.

The USPTO respectfully rejects claim 1 under 35 U.S.C. § 102(a) as being anticipated by Maria Rijn Van.

A. Van does not disclose a jetting voltage applying section comprising a jetting electrode provided on a back end surface of a nozzle plate and having an ink passage hole, as claimed in claim 1.

Claim 1 claims in relevant part:

> "a liquid jetting head comprising a nozzle to jet the droplet from an edge portion, an inside diameter of the edge portion of the nozzle being more than 0.2 μm and being not more than 4 μm, and at least the edge portion of the nozzle being formed with insulating material, the nozzle being integrally formed with a nozzle plate;
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> . . .
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> a jetting voltage applying section to apply a jetting voltage to the liquid solution in the nozzle, the jetting voltage applying section comprising a jetting electrode provided as a layer **on a back end surface of the nozzle plate**, the jetting electrode **having a ink passage hole** positioned at a border between the liquid solution supplying section and the inside passage. **(emphasis added)**

No new matter is introduced by these amendments. Support for the amendments can be found on pages 30-31 and 35 of the present specification. Regarding these limitations, it is respectfully not seen where Van discloses the claimed structure quoted above.

Specifically, the USPTO respectfully alleges on page 2 of the Office Action that paragraph [0078], lines 1-5 of Van (US 2003/018507) discloses a jetting voltage applying section. However, it is respectfully noted that Van only teaches that droplets can be charged with an external voltage during droplet formation. **It is respectfully important to note that Van does not disclose anything about the structure that allegedly charges the droplets; Van merely teaches that the droplets can be charged.** Thus, it is respectfully asserted that

Van does not teach or suggest the specifically claimed structure of a jetting voltage applying section comprising a jetting electrode provided on a back end surface of the nozzle plate and having an ink passage hole, as claimed in claim 1.

In contrast, present Figure 11 illustrates one possible embodiment of the claimed structure quoted above. Specifically, present Figure 11 shows **a jetting electrode 58 provided on a back end surface of nozzle plate 56c.** Additionally, present Figure 11 shows **passage 52 formed in part through jetting electrode 58**; therefore, the portion where passage 52 passes through jetting electrode 58 is one example of an ink passage hole, as claimed in claim 1. Thus, it is respectfully asserted that jetting electrode 58 is one example of a jetting voltage applying section having a jetting electrode provided on a back end surface of the nozzle plate and having an ink passage hole, as claimed in claim 1.

The claimed structure quoted above is important and non-trivial because it provides significant **inherent** advantages over conventional structures. For example, since the jetting voltage applying section of claim 1 is directly provided on the backside of the nozzle plate to which the nozzle is provided integrally, **the electrode can be positioned as close to the edge portion of the nozzle as possible.**

Consequently, the specifically claimed structure of claim 1 **prevents delay of voltage application by the jetting voltage applying section.** As a result, it is possible to improve the response of the liquid jetting apparatus, and thus to more rapidly operate the apparatus.

Thus, it is respectfully asserted that Van does not disclose all the claimed limitations of claim 1. Therefore, it is respectfully asserted that Van does not anticipate claim 1.

B. Van does not disclose that an inside passage length of the nozzle is set to at least not less than 50 times of the inside diameter of the nozzle at the nozzle edge portion, as claimed in claim 1.

Regarding the limitations of claim 1 that claim in relevant part:

> "wherein an inside passage length of the nozzle is set to at least not less than **50 times of the inside diameter of the nozzle** at the nozzle edge portion," **(emphasis added)**

it is respectfully not seen where Van discloses the claimed structure quoted above.

Specifically, The USPTO respectfully alleges that Van discloses that the length of cavity 13 is 50 times the diameter of nozzle 11 in paragraph [0056] of Van. However, it is respectfully asserted that **nozzle cavity 13 of Van does not correspond to the nozzle as claimed in claim 1.** Therefore, the length of nozzle cavity 13 of Van is not related to the inside passage length of the nozzle claimed in claim 1.

Instead, the inside passage length in claim 1 more closely relates to the inside passage length of nozzle orifice 11 of Van. In other words, the nozzle of claim 1 jets droplets from its tip, and the dimension thereof directly affects the size of the droplets. **In Van, droplets are jetted through nozzle orifice 11 of Van, not nozzle cavity 13, and thus it is nozzle orifice 11 of Van, and not nozzle cavity 13, that is more closely related to the claimed inside passage length of a nozzle in claim 1.**

Furthermore, as noted in paragraph [0056] of Van, nozzle orifice 11 has a diameter of 2 μm and a length of 1 μm. Therefore, the length of nozzle orifice 11 is clearly not at least 50 times the inside diameter of nozzle orifice 11, as claimed in claim 1.

In contrast present Figure 12 illustrates one possible embodiment of the claimed structure quoted above. As noted on page 45 of the present specification, **a study was done on apparatuses having an inside nozzle diameter D_I of 1 μm, and nozzle lengths H of 50 μm, 51 μm, 99 μm, and 100 μm.** Thus, page 45 describes examples of structures having an inside passage length of the nozzle that is set to at least not less than 50 times of the inside diameter of the nozzle at the nozzle edge portion, as claimed in claim 1.

Thus, it is respectfully asserted that Van does not disclose all the claimed limitations of claim 1. Therefore, it is respectfully asserted that Van does not anticipate claim 1.

II. The obviousness rejections based on Zimmerman (US 6,481,648) in view of Takahashi (US 6,412,925).

The USPTO respectfully rejects claims 1, 3-7 and 13 under 35 U.S.C. § 103(a) as being obvious over Zimmerman in view of Takahashi. Claim 1 is an independent claim.

A. The cited references do not teach or suggest a jetting voltage applying section comprising a jetting electrode provided on a back end surface of a nozzle plate and having an ink passage hole, as claimed in claim 1.

Claim 1 claims in relevant part:

> "a liquid jetting head comprising a nozzle to jet the droplet from an edge portion, an inside diameter of the edge portion of the nozzle being more than 0.2 μm and being not more than 4 μm, and at least the edge portion of the nozzle being formed with insulating material, the nozzle being integrally formed with a nozzle plate;
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> . . .
>
> a jetting voltage applying section to apply a jetting voltage to the liquid solution in the nozzle, the jetting voltage applying section comprising a jetting electrode provided as a layer **on a back end surface of the nozzle plate**, the jetting electrode **having a ink passage hole** positioned at a border between the liquid solution supplying section and the inside passage. **(emphasis added)**

No new matter is introduced by these amendments. Support for the amendments can be found on pages 30-31 and 35 of the present specification. Regarding these limitations, it is respectfully not seen where the cited references teach or suggest the claimed structure quoted above.

Specifically, the USPTO respectfully alleges on page 3 of the Office Action that Zimmerman teaches a jetting voltage applying section at connections 64 and 68. However, it is respectfully important to note that **connections 64 and 68 of Zimmerman are not provided on a back end surface of a nozzle plate, nor does either of these structures have an ink passage hole, as claimed in claim 1.** Thus, it is respectfully asserted that Zimmerman does not teach or suggest the specifically claimed jetting voltage applying section of claim 1.

Additionally, it is respectfully asserted that Takahashi does not overcome this deficiency in the primary reference Zimmerman. Specifically, Takahashi is only cited for allegedly teaching that it is preferable to reduce the ink droplet volume by reducing nozzle diameter or drive voltage. **Takahashi respectfully does not teach anything about the structure of a jetting voltage applying section, as claimed in claim 1.**

As noted above, present Figure 11 illustrates one possible embodiment of the claimed structure quoted above. Specifically, present Figure 11 shows **a jetting electrode 58 provided on a back end surface of nozzle plate 56c.** Additionally, present Figure 11 shows

passage 52 formed in part through jetting electrode 58; therefore, the portion where passage 52 passes through jetting electrode 58 is one example of an ink passage hole, as claimed in claim 1. Thus, it is respectfully asserted that jetting electrode 58 is one example of a jetting voltage applying section provided on a back end surface of the nozzle plate and having an ink passage hole, as claimed in claim 1.

As further noted above, the claimed structure quoted above is important and non-trivial because it provides significant **inherent** advantages over conventional structures. For example, since the jetting voltage applying section of claim 1 is directly provided on the backside of the nozzle plate to which the nozzle is provided integrally, **the electrode can be positioned as close to the edge portion of the nozzle as possible.**

Consequently, the specifically claimed structure of claim 1 **prevents delay of voltage application by the jetting voltage applying section.** As a result, it is possible to improve the response of the liquid jetting apparatus, and thus to more rapidly operate the apparatus.

Thus, it is respectfully asserted that the cited references, taken either alone or in combination, do not teach or suggest all the claimed limitations of claim 1. Therefore, it is respectfully asserted that claim 1 is not obvious over the cited references.

B. The dependent claims.

As noted above, it is respectfully asserted that independent claim 1 is allowable, and therefore it is further respectfully asserted that dependent claims 3-7 and 13 are also allowable.

III. The obviousness rejections based on Zimmerman (US 6,481,648) in view of Maria Rijn Van (WO 02/18058) using US 2003/018507 for reference.

The USPTO respectfully rejects claims 1, 3-7 and 13 under 35 U.S.C. § 103(a) as being obvious over Zimmerman in view of Maria Rijn Van. Claim 1 is an independent claim.

As noted above in sections I and II, **neither Zimmerman nor Van teach or suggest a jetting voltage applying section comprising a jetting electrode provided on a back end surface of a nozzle plate and having an ink passage hole**, as claimed in claim 1.

Thus, it is respectfully asserted that the cited references, taken either alone or in combination, do not teach or suggest the claimed limitations quoted above. Therefore, it is respectfully asserted that independent claim 1 is not obvious over the cited references, and it is further respectfully asserted that dependent claims 3-7 and 13 are also allowable.

IV. The new claims.

Applicants respectfully note that new claims 14 and 15 have been added. No new matter is introduced by these amendments. Support for the amendments can be found on pages 31 and 35 of the present specification.

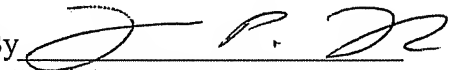
V. Conclusion.

Reconsideration and allowance of all of the claims is respectfully requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Please contact the undersigned for any reason. Applicants seek to cooperate with the Examiner including via telephone if convenient for the Examiner.

Respectfully submitted,

By 
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